IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	:	
Shin ASADA et al.	:	
Serial No. NEW	:	**Attn: Application Branch**
Filed March 4, 2002	:	**Attorney Docket No. 2002_0321**

AN OPTICAL DISC, A RECORDER, A PLAYER, A RECORDING METHOD, AND A REPRODUCING METHOD THAT ARE ALL USED FOR THE OPTICAL DISC
(Rule 1.53(b) Continuation of Serial No. 09/661,284, Filed September 14, 2000)

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents,
Washington, DC 20231

THE COMMISSIONER IS AUTHORIZED TO CHARGE ANY DEFICIENCY IN THE FEES FOR THIS PAPER TO DEPOSIT ACCOUNT NO. 23-0975

Sir:

Kindly amend the above-identified application as follows.

IN THE ABSTRACT

Please replace the original abstract with the enclosed substitute abstract.

IN THE SPECIFICATION

Please amend the specification as follows.

Please replace the paragraph beginning at page 6, line 9, with the following rewritten paragraph:

With this construction, each video object unit contains control information, therefore, display control and copying control can be achieved for each video object unit, which is to say, different display and copying control can be performed for every second or lower. This enables the change of, for instance, a display style or copying permission during a certain period, such as a commercial, of a program.

Please replace the paragraph beginning at page 8, line 20, with the following rewritten paragraph:

Here, in addition to at least one video object that contains control information, at least one piece of stream information and a video object that contains no control information may be recorded on the recordable optical disc. Each piece of stream information may be associated with at least one video object, and contain: aspect information that shows an aspect ratio of the at least one video object associated with the piece of stream information; and an application flag that shows either: (a) that the video object is encoded using the aspect ratio in the aspect information; or (b) that the video object is not necessarily encoded using the aspect ratio in the aspect information, and an aspect ratio in control information in each video subject unit is used.

Please replace the paragraphs beginning at page 13, lines 10 through 12, with the following rewritten paragraphs:

FIG. 15 shows a conversion table for Subtitling Mode;

FIG. 16 shows a conversion table for Film/Camera Mode;

Please replace the paragraph beginning at page 21, lines 17 and 18, with the following rewritten paragraph:

1101b : display a letterbox image with the aspect
ratio of 16 : 9 in the center of the screen

Please replace the paragraph beginning at page 25, line 4, with the following rewritten paragraph:

Of the above types, type 1 is a method to disturb an AGC (automatic gain control) circuit of a VTR, and type 2 is a method that combines the above AGC disturbance method and a method to invert two colorstripes. Type 3 refers to a method that combines the above AGC disturbance method and a method to invert four colorstripes. On receiving a video signal into which information

regarding the APS has been multiplexed, the optical disc recorder/player 1 sets the APSTB based on the received APS.

Please replace the paragraph beginning at page 34, line 20, with the following rewritten paragraph:

FIG. 12 is a flowchart showing the detailed processing by the DCI generating unit 732 to generate the DCI data and DCI_SS data. The DCI generating unit 732 judges whether the VBID detecting unit 731 has detected VBID (step S121). If VBID has been detected and the current analog video signal is an NTSC signal (step S122), the DCI generating unit 732 sets "01b" in the DCI_SS register (step S123). This is because the NTSC signal contains VBID of which only the Aspect Ratio can be set as valid DCI.

Please replace the paragraph beginning at page 35, line 2, with the following rewritten paragraph:

Following this, the DCI generating unit 732 converts the two bits (**b1** and **b2**) of the 20-bit VBID, which has been detected by the VBID detecting unit 731, according to a conversion table shown in FIG. 13. As a result, the two bits are converted into four bits. The DCI generating unit 732 then sets the four bits in **b4-b7** of the DCI register as the Aspect Ratio, and "0" in the remaining bits of the DCI register as the Subtitling Mode and the Film/Camera Mode (Step S124). The DCI generating unit 732 sets "00b" in the DCI_SS register if the above two bits (**b1** and **b2**) are "11b".

Please replace the paragraph beginning at page 35, line 12, with the following rewritten paragraph:

On the other hand, when judging in step 122 that the analog video signal is a PAL signal, the DCI generating unit 732 sets "11b" in the DCI_SS register (step S125) because the PAL signal contains VBID of which the Aspect Ratio, the Subtitling Mode, and the Film/Camera Mode can be set as valid DCI.

Please replace the paragraph beginning at page 35, line 18, with the following rewritten paragraph:

Following this, the DCI generating unit 732 converts four bits (**b0** to **b3** for the Aspect Ratio), two bits (**b9** and **b10** for the Subtitling Mode), and one bit (**b4** for the Film/Camera Mode) of the 13-bit VBID, according to conversion tables shown in FIGs. 14-16. The DCI generating unit 732 then sets the converted bits in the DCI register as the Aspect Ratio, the Subtitling Mode, and the Film/Camera Mode (step S126).

Please replace the paragraph beginning at page 35, line 26, with the following rewritten paragraph:

When the VBID detecting unit 731 has not detected any VBID (step S121), the DCI generating unit 732 sets "0" in all the bits of the DCI register and the DCI_SS register (step S127).

Please replace the paragraph beginning at page 36, line 3, with the following rewritten paragraph:

After setting data in the DCI register and the DCI_SS register in this way, the DCI generating unit 732 outputs all the data to the DVD recorder 75 (step S128).

Please replace the paragraph beginning at page 36, line 16, with the following rewritten paragraph:

FIG. 17 is a flowchart showing the detailed processing by the CCI generating unit 734 to generate the CCI data and CCI_SS data. On judging that an analog video signal inputted from the image demodulator 72 is an NTSC signal and that the VBID detecting unit 731 has detected the VBID (step S171), the CCI generating unit 734 sets "111B" in the CCI_SS register (step S172). These bits can be updated through the following processing. When the judging that two bits (**b7** and **b8**) of the 20-bit VBID that has been detected by the VBID detecting unit 731 are "11b" (indicating that copying is prohibited) (step S173), the CCI generating unit 734 outputs a recoding stop signal to the switch 82 and the DVD recorder 75 (step S174) so that the switch 82 becomes OFF and the

analog video signal is not outputted to the DVD recorder 75. As a result, the DVD recorder 75 stops the processing that records data for the DVD-RAM. Thereafter, when receiving VBID that does not prohibit copying, the CCI generating unit 734 clears the recording prohibition, clears the stored data in the buffer 81, sets the switch 82 on, and resumes the recording processing.

Please replace the paragraph beginning at page 37, line 9, with the following rewritten paragraph:

After giving the "NO" judgement in step S173, the CCI generating unit 734 further judges if the above two bits (**b7** and **b8**) of the 20-bit VBID are "01b" (indicating that the CGMS is undefined) (step S175). If so, the CCI generating unit 734 sets "011b" in the CSI_SS register (step S176). When the MV detecting unit 733 has judged that Macrovision is not used for the video signal (step S177), the CCI generating unit 734 changes the bit (**b2**) in the CCI_SS register to "0" (step S178).

Please replace the paragraph beginning at page 37, line 18, with the following rewritten paragraph:

After this, the CCI generating unit 734 converts sets of bits (**b7-b8, b9-b10,** and **b11**) into the CGMS, the APSTB, and the Source using conversion tables shown in FIGs. 18-20 (step S179), and sets them in the CCI register (step S179).

Please replace the paragraph beginning at page 37, line 22, with the following rewritten paragraph:

On the other hand, when the video signal from the image demodulator 72 is not an NTSC signal and the VBID detecting unit 731 has not detected any VBID from the signal (step S171), the CCI generating unit 734 sets "0" in the all the bits of the CCI register and the CCI_SS register (step S180) since no CCI information exists for the video signal.

Please replace the paragraph beginning at page 40, line 13, with the following rewritten paragraph:

When a DVD-RAM is loaded and playback or recording is performed, the drive 1408 performs the servo control and the roll control when the recording or the playing is performed. The drive 1408 writes a VOB stored in the track buffer 1407 onto the DVD-RAM via an optional pickup, and reads a VOB from the DVD-RAM into the track buffer 1407 via the optical pickup. In reality, however, a write onto and a read from the DVD-RAM are performed in a unit of an ECC (Error Correcting Code) block (i.e., sixteen sectors that are equal to 2KB x 16 packs). This is not related to the essence of present invention and so will not be described.

Please replace the paragraph beginning at page 48, line 9, with the following rewritten paragraph:

When playback is to be performed, the demultiplexer 1702 receives a VOB from the track buffer 1407, and places the payload (i.e., packet) of each pack making up the VOB into the control information outputting unit 1709, the video buffer 1703, or the audio buffer 1707 in accordance with a type of the pack.

Please replace the paragraph beginning at page 50, line 20, with the following rewritten paragraph:

Aspect Ratio set in DCI of control information is used by the optical disc recorder/player 1 as follows. When recording, for instance, a movie program with an aspect ratio of 16 : 9 together with commercials with an aspect ratio of 4 :3 which are broadcasted at intervals of the movie, the optical disc recorder/player 1 sets "16 : 9" as the Aspect Ratio shown in DCI of a C_PCK in each VOBU that correspond to the movie, and "4 : 3" as the Aspect Ratio in a C_PCK of each VOBU that corresponds to the commercials. In this way, the aspect ratio for each VOBU is recorded. When reproducing this movie, the optical disc recorder/player 1 has the VBI signal multiplexer 84 multiplex VBID containing these aspect ratios into a video signal.

REMARKS

The above amendments are to make a number of editorial revisions to the specification. No new matter has been added. A copy of the amended portion of the specification with changes marked therein is attached and labeled ***"Version with Markings to Show Changes Made"***.

Respectfully submitted,

Shin ASADA et al.

By _____
David M. Ovedovitz
Registration No. 45,336
Attorney for Applicants

DMO/jmj
Washington, D.C. 20006-1021
Telephone (202) 721-8200
Facsimile (202) 721-8250
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Here, each video object may be generated from an analog video signal, and control information may indicate a content of data that is multiplexed into vertical blanking intervals in the analog video signal.

Here, the control information may show at least one of: (a) a display position for the video object unit; (b) copying management conditions for the video object unit; and (c) a source-material type for the video object unit.

With this construction, each video object unit contains control information, ~~and so~~ therefore, display control and copying control can be achieved for each video object unit, which is to say, different display and copying control can be performed for every second or lower. This enables ~~to~~ the change of, for instance, a display style or copying permission during a certain period, such as a commercial, of a program.

Here, each video object unit may contain one control pack and a plurality of video packs into which video data is placed. The control pack may be placed at a start of the video object unit and contains the control information.

For this construction, a control pack is located at a start of each video object unit. This simplifies an operation by an optical disc recorder to insert a control pack into each video object unit, and so can reduce the operation load of the optical disc recorder.

Here, the control information may further contain status information showing which parts of the control information are valid.

Here, the control information may contain information regarding Copy Generation Managing System to show whether to permit the video object unit to be copied onto another recording medium.

With this construction, information regarding Copy Generation Management System can be set, for each video object unit, in control information.

Here, the control information may contain information regarding Analog Protection System (APS) to show a type of APS copy protection method used on an analog video signal based on which the video object unit was generated.

With this construction, information regarding Analog Protection System can be set, for each video object unit, in control information.

Here, the control information may contain source information that shows whether a source material of the video object unit is an analog pre-recorded package medium.

With this construction, source information can be set in control information for each video object unit.

Here, in addition to at least one video object that contains control information, at least one piece of stream information and a video object that contains no control information may be recorded on the recordable optical disc. Each piece of stream information may be associated with at least one video object, and contain: aspect information that shows an aspect ratio of the at least one video object associated with the piece of stream information; and an

application flag that shows either: (a) that the video object is encoded using the aspect ratio in the aspect information; or (b) that the video object is not necessarily encoded using the aspect ratio in the aspect information, and an aspect ratio in control information in each video object unit is used.

As this stream information is recorded separately from each video object, an optical disc player can obtain an aspect ratio in the stream information for each video object unit without needing to read the video object if an application flag is shown as "00b". In this way, the optical disc player can judge whether an aspect ratio of a video object or of each video object unit should be used for the video object, using the application flag. In addition, a size of a video object that contains no control information can be reduced by the size of this control information.

The above object can be also achieved by a recording to record a video object containing at least one video object unit onto an optical disc, including: an extracting step for extracting data that is multiplexed into an audio-video signal, the data relating to display control and copying control; an encoding step for encoding the audio-video signal to generate video data and audio data; a generating step for generating control information that relates to display control and copying control based on the extracted data; and a multiplexing step for multiplexing the control information, the video data, and the audio data that have been generated

construction of an optical disc recorder/player in FIG. 1;

FIG. 11 is a block diagram showing a detailed construction of a VBID demodulator;

FIG. 12 is a flowchart showing the processing by the DCI generating unit to generate DCI;

FIG. 13 shows a conversion table for an aspect ratio of an NTSC (National Television System Committee) signal;

FIG. 14 shows a conversion table for an aspect ratio of a PALplus (Phase Alternation by Line) signal;

FIG. 15 shows a conversion table for Film/Camera Mode;

FIG. 16 shows a conversion table for Subtitling Mode;

FIG. 17 is a flowchart showing the detailed processing by the CCI generating unit;

FIG. 18 shows a conversion table for CGMS (Copy Generation Managing System);

FIG. 19 shows a conversion table for APSTB (Analog Protection System Trigger Bits);

FIG. 20 shows a conversion table for Source Information;

FIG. 21 is a block diagram showing a detailed construction of a DVD recorder;

FIG. 22 is a block diagram showing a detailed construction of an encoding unit;

FIG. 23 is a block diagram showing a detailed construction of a system encoder;

FIG. 24 is a flowchart showing the processing by a

methods can be used, such as displaying the letterbox image with black bars in the top and bottom parts of the screen as shown in the figure, displaying the letterbox image in a top part of the screen with a black area below, or stretching the image in the vertical direction. The letterbox control information designates such a display method, and usually shows information regarding X' : Y' and either Y : Z or Y : Z' measured from the center "O" of a display image.

The Aspect Ratio is shown as four bits (**b4** to **b7**) and shows the following information.

0000b : 4 :3

0001b : 16 : 9

1000b : display a letterbox image with the aspect ratio of 14 : 9 in the center of the screen

0100b : display a letterbox image with the aspect ratio of 14 : 9 in a top part of the screen

1101b : display a letterbox image with the aspect ratio of 16 : 9 in the center of the screen

0010b : display a letterbox image with the aspect ratio of 16 : 9 in a top part of the screen

1011b : display a letterbox image with the aspect ratio of 16 (or larger) : 9 in the center of the screen

0111b : display a letterbox image with the aspect ratio of 14 : 9 on the entire screen

others : reserved

10b : type 2 of APS is on

11b : type 3 of APS is on

(4) Of the above types, type 1 is a method to disturb an AGC (automatic gain control) circuit of a VTR, and type 2 is a method that combines the above AGC disturbance method and a method to invert two ~~colorstipes~~ colorstripes. Type 3 refers to a method that combines the above AGC disturbance method and a method to invert four ~~colorstipes~~ colorstripes. On receiving a video signal into which information regarding the APS has been multiplexed, the optical disc recorder/player 1 sets the APSTB based on the received APS.

The Source is shown as one bit (**b3**) that shows whether a source material for images is an analog pre-recorded package medium as follows.

0b : analog pre-recorded package medium

1b : not analog pre-recorded package medium

The Source is set by a source provider, and written in VBI data of a video signal inputted to the optical disc recorder/player 1. The Source is defined in *CEI(Commission Electrotechnique Internationale) /IEC6880 1998 01 Section 3* "VBID (VBI data)". The Source is set as "0b" (showing that a source material is the analog pre-recorded package medium) when a video signal inputted to the optical disc recorder/player 1 was generated from a source material such as packaged software for a movie like a laserdisc pressed at a factory. Source is set as "1b" when the inputted video signal was generated based on not the analog pre-recorded

whether a source medium for an image for the field is the analog pre-recorded medium. On the other hand, the above 13-bit VBID contains the following bits: four bits (**b0** to **b3**) showing Aspect Ratio or letterbox control information; one bit (**b4**) showing the Film/Camera Mode; and two bits (**b9** and **b10**) showing the Subtitling Mode. The VBID detecting unit 731 detects the above 20-bit VBID from an NTSC signal, and the 13-bit VBID from a PAL signal.

The MV detecting unit 733 detects whether Macrovision is used as a copy protection method for the analog video signal which has been inputted from the image demodulator 72.

3.1.1 DCI Generating Unit

The DCI generating unit 732 includes a one-byte internal DCI register and a two-bit internal DCI_SS register. After generating data for DCI and DCI_SS based on the detected VBID, the DCI generating unit 732 sets the DCI data and DCI_SS data in the above two registers, which then output the stored data to the DVD recorder 75.

FIG. 12 is a flowchart showing the detailed processing by the DCI generating unit 732 to generate the DCI data and DCI_SS data. The DCI generating unit 732 judges whether the VBID detecting unit 731 has detected VBID (step S121). If VBID has been detected and the current analog video signal is an NTSC signal (step S122), the DCI generating unit 732 sets "01b" in the DCI_SS register (step S123). This is because the NTSC signal contains VBID of which only the

Aspect Ratio can be set as valid DCI.

Following this, the DCI generating unit 732 converts the two bits (**b1** and **b2**) of the 20-bit VBID, which has been detected by the VBID detecting unit 731, according to a conversion table shown in FIG. 13. As a result, the two bits are converted into four bits. The DCI generating unit 732 then sets the four bits in **b4-b7** of the DCI register as the Aspect Ratio, and "0" in the remaining bits of the DCI register as the Subtitling Mode and the Film/Camera Mode (Step ~~124~~ S124). The DCI generating unit 732 sets "00b" in the DCI_SS register if the above two bits (**b1** and **b2**) are "11b".

On the other hand, when judging in step 122 that the analog video signal is a PAL signal, the DCI generating unit 732 sets "11b" in the DCI_SS register (step ~~125~~ S125) because the PAL signal contains VBID of which the Aspect Ratio, the Subtitling Mode, and the Film/Camera Mode can be set as valid DCI.

Following this, the DCI generating unit 732 converts four bits (**b0** to **b3** for the Aspect Ratio), two bits (**b9** and **b10** for the Subtitling Mode), and one bit (**b4** for the Film/Camera Mode) of the 13-bit VBID, according to conversion tables shown in FIGs. 14-16. The DCI generating unit 732 then sets the converted bits in the DCI register as the Aspect Ratio, the Subtitling Mode, and the Film/Camera Mode (step ~~126~~ S126).

When the VBID detecting unit 731 has not detected any VBID (step S121), the DCI generating unit 732 sets "0" in all

the bits of the DCI register and the DCI_SS register (step S127).

After setting data in the DCI register and the DCI_SS register in this way, the DCI generating unit 732 outputs all the data to the DVD recorder 75. (step S128)

3.1.2 CCI Generating Unit

The CCI generating unit 734 includes a one-byte internal CCI register and a three-bit internal CCI_SS register, and generates CCI data and CCI_SS data based on the VBID that has been detected by the VBID detecting unit 731 and on a detection result generated by the MV detecting unit 733. The CCI generating unit 734 then sets the generated CCI data and CCI_SS data in the above two registers, and outputs the data in the registers to the DVD recorder 75.

FIG. 17 is a flowchart showing the detailed processing by the CCI generating unit 734 to generate the CCI data and CCI_SS data. On judging that an analog video signal inputted from the image demodulator 72 is an NTSC signal and that the VBID detecting unit 731 has detected the VBID (step S171), the CCI generating unit 734 sets "111b" in the CCI_SS register (step S172). These bits can be updated through the following processing. When judging that two bits (**b7** and **b8**) of the 20-bit VBID that has been detected by the VBID detecting unit 731 are "11b" (indicating that copying is prohibited) (step S173), the CCI generating unit 734 outputs a recoding stop signal to the switch 82 and the DVD recorder

75 (step ~~174~~ S174) so that the switch 82 becomes OFF and the analog video signal is not outputted to the DVD recorder 75. As a result, the DVD recorder 75 stops the processing that records data for the DVD-RAM. Thereafter, when receiving VBID that does not prohibit copying, the CCI generating unit 734 clears the recording prohibition, clears the stored data in the buffer 81, sets the switch 82 on, and resumes the recording processing.

After giving the "NO" judgement in step S173, the CCI generating unit 734 further judges if the above two bits (**b7** and **b8**) of the 20-bit VBID are "01b" (indicating that the CGMS is undefined) (step S175). If so, the CCI generating unit 734 sets "011b" in the CCI_SS register (step ~~176~~ S176). When the MV detecting unit 733 has judged that Macrovision is not used for the video signal (step ~~177~~ S177), the CCI generating unit 734 changes the bit (**b2**) in the CCI_SS register to "0" (step S178).

After this, the CCI generating unit 734 converts sets of bits (**b7-b8**, **b9-b10**, and **b11**) into the CGMS, the APSTB, and the Source using conversion tables shown in FIGs. 18-20 (step S179), and sets them in the CCI register. (step S179)

On the other hand, when the video signal from the image demodulator 72 is not an NTSC signal and the VBID detecting unit 731 has not detected any VBID from the signal (step S171), the CCI generating unit 734 sets "0" in the all the bits of the CCI register and the CCI_SS register (step ~~180~~ S180) since no CCI information exists for the video signal.

The encoding unit 1404 generates a V_PCK and an A_PCK by compressing the video signal and audio signal inputted from the A/V signal inputting unit 1403, and generates a C_PCK based on the control information inputted from the system controlling unit 1402. The encoding unit 1404 then generates a VOB made up of VOBUs that each have a C_PCK at a start. The above operations are performed under the control of the system controlling unit 1402.

The track buffer 1407 temporarily stores a VOB generated by the encoding unit 1404 when recording is to be performed, and stores a VOB read from the DVD-RAM when playback is to be performed.

When a DVD-RAM is loaded and playback or recording is performed, the drive 1408 performs the servo control and the roll control when the recording or the playing is performed. The drive ~~1403~~ 1408 writes a VOB stored in the track buffer 1407 onto the DVD-RAM via an optical pickup, and reads a VOB from the DVD-RAM into the track buffer 1407 via the optical pickup. In reality, however, a write onto and a read from the DVD-RAM are performed in a unit of an ECC (Error Correcting Code) block (i.e., sixteen sectors that are equal to 2KB × 16 packs). This is not related to the essence of present invention and so will not be described.

The decoding unit 1406 receives a VOB that has been read from the DVD-RAM and sent from the track buffer 1407, decompresses the VOB to obtain a digital video signal and a digital audio signal. At the same time, the decoding unit

3.2.2 Decoding Unit

FIG. 25 is a block diagram showing the detailed construction of the decoding unit 1406 shown in FIG. 21. As shown in the figure, the decoding unit 1405 includes a demultiplexer 1702, a video buffer 1703, a video decoder 1704, a reordering buffer 1705, a switch 1706, an audio buffer 1707, an audio decoder 1708, and a control information outputting unit 1709.

When playback is to be performed, the demultiplexer 1702 receives a VOB from the track buffer 1407, and places the payload (i.e., packet) of each pack making up the VOB into the control information outputting unit 1709, the video buffer 1703, or the audio buffer 1707 in accordance with a type of the pack.

The video decoder 1704 extracts a packet from the video buffer 1703 and decodes the extracted packet. The above extraction is performed when a DTS written in a packet stored at a start of the video buffer 1703 is equal to the STC.

The reordering buffer 1705 buffers a plurality of sets of decoded video data and is used when the plurality of sets of the video data are rearranged to change the decoding order of the video data into the displaying order for pictures.

The switch 1706 receives the decoded video data from the video decoder 1704 and the reordering buffer 1705, and outputs video data that corresponds to one picture to the

signal multiplexer 84 multiplexes VBID during the VBIs of all the fields based on this held control information.

As has been described, the optical disc recorder/player 1 of the above embodiment inserts, as a C_PCK, display control information and copy control information that have been multiplexed during VBIs into VOBUs when converting a television (or video) signal to record it onto the present optical disc. As a result, the present optical disc recorder/player can control, for each VOBU, the recording onto and the playing from the optical disc using the display control information and copy control information. To generate such VOBUs, the system controlling unit 1402 merely needs to output control information to the encoding unit 1404 whenever the system controlling unit 1402 has been notified by the encoding unit 1404 that the encoding for one VOBU has been completed, and the encoding unit 1404 merely needs to insert one C_PCK into a start of each VOBU. As this operation to insert a C_PCK is simple, the operation load of the encoding unit 1404 is very small.

Aspect Ratio set in DCI of control information is used by the optical disc recorder/player 1 as follows. When recording, for instance, a movie program with an aspect ratio of 16 : 9 together with commercials with an aspect ratio of 4 :3 which are broadcasted at intervals of the movie, the optical disc recorder/player 1 sets "16 : 9" as the Aspect Ratio shown in DCI of a C_PCK in each VOBU that correspond to the movie, and "4 : 3" as the Aspect Ratio in a C_PCK of each

VOBU that correspond to the commercials. In this way, the aspect ratio for each VOBU is recorded. When reproducing this movie, the optical disc recorder/player 1 has the VBI signal multiplexer 84 multiplex VBID containing these aspect ratios into a video signal.

The letterbox control information set in the Aspect Ratio is used by the optical disc recorder/player 1 as follows. When recording a movie given the letterbox control information showing that images for the movie have an aspect ratio of 16 : 9 and should be displayed in a top part of the screen, together with commercials given the letterbox control information showing that the commercials have an aspect ratio of 16 :9 and should be displayed in the center of the screen, for instance, the optical disc recorder/player 1 inserts suitable letterbox control information into a C_PCK of each VOBU based on VBI data. As a result, the letterbox controlling changes when the content of the program is switched from the movie to a commercial or vice versa. When reproducing these recorded programs, the optical disc recorder/player 1 has the VBI signal multiplexer 84 multiplex VBID containing the letterbox control information into a video signal. Accordingly, letterbox control information for each VOBU can be effectively used even after programs are recorded on the optical disc.

Subtitling Mode set in DCI of the control information is used by the optical disc recorder/player 1 as follows. When consecutively recording, for instance, programs A to C